

Kit Rawson, 5/22/2006

1 IN THE UNITED STATES DISTRICT COURT
2 FOR THE WESTERN DISTRICT OF WASHINGTON
3 AT SEATTLE

4
5 UNITED STATES OF AMERICA,)
6 et al.,) No. C70-9213
7 Plaintiffs,) Subproceeding No. 01-1
8 vs.) (Culverts)
9 STATE OF WASHINGTON, et al.,)
10 Defendants.)

11 DEPOSITION UPON ORAL EXAMINATION
12 OF
13 KIT RAWSON
14

15 9:15 a.m.
16

17 May 22, 2006

18 OFFICE OF THE ATTORNEY GENERAL
19 900 Fourth Avenue 2200
20 Seattle, Washington 98164
21
22

23 JACQUELINE L. BELLOWS
24 CCR 2297
25

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1 Washington?

2 A To my knowledge the Quinault, Quileute, Hoh, Makah.

3 Q Do all of those tribes typically exercise their fishing
4 rights in the ocean?

5 A Some of them, to my knowledge some of them exercise the
6 majority of their fishing right in the river, in
7 terminal-area fisheries.

8 Q Why would they do that rather than fishing in the ocean,
9 if you know?

10 A I don't know. I could guess. I don't know.

11 Q Well, if you have an opinion, you have a right to offer
12 it. But if you don't know, that's okay too.

13 Do culverts have any effect on the tribes'
14 fisheries off the Washington coast?

15 A I don't know if specific culverts, but certainly
16 reduction in available habitat of any of the stocks
17 contributing to the fishery could have an effect on that
18 fishery. Blockage of habitat, blockage of rearing areas
19 certainly could.

20 Q Would that effect be most prominent if the stock in
21 question were a limiting stock?

22 A It might be most prominent -- in some cases you could
23 say it's most prominent if the stock were a limiting
24 stock. However, there's more to the quantity of fish
25 available than just what the limiting stock is.

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1 Something else that determines the quantity of fish
2 available is the quantity of fish in the ocean. So
3 anything that reduced abundance of any stock affects the
4 opportunity of the tribes in the ocean if -- anything
5 that effects abundance effects the total number of fish
6 harvested. It's not just limiting stocks.

7 Q Is it a greater effect if the culverts are affecting
8 limiting stocks?

9 A It depends on the particular situation.

10 Q Could you give an example?

11 A I could give a hypothetical example, certainly.

12 Q Sure.

13 A If you had two stocks in the fishery and the harvest
14 rate were determined to -- by one limiting stock but the
15 other stock provided most of the abundance, most of the
16 available fish, if you reduced that abundant stock by
17 half or by two thirds, the harvest, allowable harvest
18 rate applied to the reduced abundance would result in a
19 much smaller amount of fish available for harvest in the
20 quota.

21 Q Is there a particular stock that you could plug into
22 that example?

23 A Not at this time.

24 Q Let's move into the Strait of Juan de Fuca. You said
25 that you go to some meetings in the Pacific Salmon

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1 Treaty process. Are you familiar with the Pacific
2 Salmon Treaty?

3 A Yes, I am.

4 Q Do you know when it took effect?

5 A 1985, I believe.

6 Q You said that you're currently not an official member of
7 any of the bodies. Have you been an official member of
8 any of the implementing bodies in the past?

9 MR. RAAS: I am not sure what you mean by
10 "implementing bodies."

11 Q (By Ms. Woods) As I understand it, there's panels and
12 technical committees set up under the Pacific Salmon
13 Treaty. Have you been a member of any of those bodies?

14 A No, I have not.

15 Q But you said you're generally familiar with the way that
16 fisheries are managed under the Pacific Salmon Treaty?

17 A Yes.

18 Q Okay. So as I understand it, under the Pacific Salmon
19 Treaty, Canada and the United States share the catch of
20 Fraser River sockeye and pink salmon. Is that your
21 understanding?

22 A Yes.

23 Q I understand that Fraser River sockeye and pink salmon
24 spawn in Canada; is that correct?

25 A Yes. There's a small tributary of the Fraser River that

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1 whatever?

2 MS. WOODS: Well, let's start with just
3 sockeye.

4 Q (By Ms. Woods) Add up all the commercial catches for
5 the nine sockeye tribes in 2005. What percentage of
6 that is Fraser River sockeye?

7 A The vast majority of the sockeye catch would be Fraser
8 River sockeye. If there was a fishery. Yes, there was.

9 Q Let's try for adding up all commercial catches of all
10 species. And what percentage of that would be stocks
11 from the Fraser River for the nine sockeye tribes in
12 2005?

13 A I can't answer that without doing the analysis.

14 Q Okay. Has the proportion of stocks, staying with the
15 nine sockeye tribes, making up the commercial fisheries
16 of those tribes, has the proportion that's Fraser River
17 stocks changed in the past 20 years?

18 A It's been variable over the past 20 years. As I said,
19 I've not done the analysis. I know, though, from
20 looking at Tulalip catches, for example, that some years
21 the Fraser River sockeye stocks in particular are very
22 important to the tribal fishery. In other years, such
23 as 1999 I believe, there was no Fraser River sockeye
24 catch. So other stocks are important.

25 Q What happened in 1999?

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1 A The run was low enough that conservation concerns
2 mandated no fishery, basically. I believe that was
3 1999.

4 Q Were those conservation concerns caused by any effect
5 from state-owned culverts?

6 A I doubt it.

7 Q I made you describe how the ocean fisheries are managed.
8 Could you please describe your understanding of how the
9 Fraser fisheries are managed, the Fraser panel
10 fisheries.

11 A The Fraser panel fisheries include the fisheries
12 directed at the Fraser River sockeye and Fraser River
13 pinks. There are -- again, I'm going to try to be
14 concise here. For sockeye, there are many components to
15 the Fraser sockeye run. For management purposes, it's
16 divided into four main components, each of which has a
17 management objective, which in the old days was an
18 escapement goal, now is more complex, but basically says
19 what fraction of the run from that component can be
20 harvested.

21 The harvestable amount from each component is
22 estimated preseason before the fish return; and on that
23 basis, a preliminary fishing pattern is set, which
24 includes consideration that the total harvest shall be
25 within the allowable harvest amount and that the United

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1 come into play, because certainly one of the formerly
2 strong components of the Fraser run, the fall, the late,
3 the so-called late ones has greatly declined in
4 abundance and has become a stock of concern rather than
5 a stock providing the bulk of the harvest -- things like
6 that.

7 Q And that late-running sockeye, that's a Fraser River
8 stock, right?

9 A That's right.

10 Q That spawns in Canada as far as we know, right?

11 A That's right.

12 Q And the Thompson Coho, that's also a Canadian stock?

13 A That's correct.

14 Q Are there other containing stocks, besides the Puget
15 Sound chinook, in that fishery?

16 A As I said, we, we pay close attention to the coho salmon
17 by-catch in the Fraser sockeye fishery. In recent years
18 because of these other factors, I don't recall that the
19 Puget Sound coho have come into play; but we certainly
20 pay attention to them.

21 Q What would you consider to be the most constraining
22 stock in the Fraser sockeye fisheries?

23 MR. RAAS: In which years?

24 MS. WOODS: Well, let's take 2006 as an
25 example.

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1 A It's hard to say what the most constraining stock is,
2 although I would say it would be the Fraser River
3 sockeye themselves. The Thompson coho are there as
4 well.

5 Q (By Ms. Woods) Do culverts owned by the State of
6 Washington affect those stocks in your opinion?

7 A The Fraser River sockeye and the Thompson coho?

8 Q Correct.

9 A Unlikely.

10 Q It's my understanding -- and I'm a lawyer -- it's my
11 understanding that Fraser River sockeye normally migrate
12 through the Strait of Juan de Fuca on their way to the
13 Fraser River mouth; is that correct?

14 A That's the so-called normal migration path. However,
15 the general migration path for Fraser River sockeye
16 would be to come ashore near the north end of Vancouver
17 Island and either go around to the south through the
18 Strait of Juan de Fuca or go through Johnston Strait and
19 enter the Strait the Georgia from the north.

20 Q So if they go through Johnston Strait and enter the
21 Strait of Georgia from the north, do they ever enter
22 U.S. waters?

23 A Yes, they certainly do. There's a milling pattern of
24 Fraser River sockeye in Lower Georgia Strait, which
25 would be in the Point Roberts area in U.S. waters.

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1 Q When the sockeye do that, are there fewer of them
2 available for harvest in the United States than if they
3 come through the Strait of Juan de Fuca?

4 A Generally, yes. And they're certainly not as available
5 over as wide an area.

6 Q So as I understand it, what you're saying, the normal
7 pattern is they come through the Strait of Juan de Fuca
8 but some may go around through Johnston Strait instead.
9 Does it vary from year to year what percentage take
10 which path?

11 A It varies from year to year, yes.

12 Q Are there some years when a lot of Fraser River sockeye,
13 when a high percentage go through the Johnston Strait
14 path instead of the Strait of Juan de Fuca?

15 A Yes, there are some, yes.

16 Q Was there a year recently when a high percentage did
17 that?

18 A It's happened in several recent years.

19 Q When there's a Johnston Strait migration, how does that
20 affect -- when a high percentage of the Fraser River
21 sockeye migrate through Johnston Strait, how does that
22 affect the plaintiff tribes' fisheries?

23 A It reduces, certainly reduces the opportunity for the
24 tribes to fish in the Strait of Juan de Fuca, only, to
25 harvest those fish. And it reduces the opportunity for

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1 the other sockeye tribes to fish. Although there's some
2 opportunity in the Georgia -- in the U.S. part of
3 Georgia Strait from time to time.

4 Q Does that mean that the tribes may not be able to catch
5 their full allocation?

6 A It depends on the situation.

7 Q Are there years when the tribes are unable to catch
8 their full allocation because of a Johnston Strait
9 migration?

10 A I believe there have been in recent years where you
11 could. It's hard to point to one cause; but I believe
12 that has clearly been the case in some recent years,
13 yes.

14 MS. WOODS: Shall we take a break? It's been
15 about an hour.

16 MR. RAAS: Yeah.

17 [A brief recess was taken.]

18 MS. WOODS: Okay. Back on the record.

19 Q (By Ms. Woods) Mr. Rawson, there was one question I
20 forgot to ask at the outset in the general questions.
21 And that is, have you ever reviewed the joint biological
22 statement that was prepared for the trial before Judge
23 Boldt in 1973, joint biological statement about salmon
24 and fisheries and so forth?

25 A No, I haven't.

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1 Q Okay. All right. I have a few more questions about the
2 Fraser fisheries, and these have to do with the Fraser
3 River pink salmon. Have there been any trends in the
4 tribe's harvest of Fraser River pink salmon since you've
5 been at Tulalip? And again, this is all the sockeye
6 tribes.

7 A Right. I haven't looked at that closely.

8 Q When we talked in some detail about weak-stock
9 management in the sockeye fisheries, are there similar
10 constraints in the Fraser River pink fisheries?

11 A Certainly. One obvious one is Fraser River pink
12 fisheries are often curtailed to protect sockeye
13 management units that might be coincident with them.

14 Q And these are the same Fraser River sockeye management
15 units that constrain the sockeye fisheries?

16 A Right.

17 Q So does that mean the tribes are letting harvestable
18 Fraser River pink salmon go by in order to conserve
19 Fraser River sockeye management units?

20 A It depends on how you define "harvestable." The overall
21 management plan, those fish are not harvestable. But
22 yes, there's a tradeoff involved in that decision,
23 certainly.

24 Q What happens to those pink salmon?

25 A They might go to spawning escapement. They might be

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1 harvested somewhere else where they're not overlapping
2 the sockeye. It depends.

3 Q If they're harvested somewhere else, would that be in
4 Canada?

5 A Yes.

6 Q Or does that mean that because of the constraints due to
7 Fraser River sockeye, Fraser River pink that would
8 otherwise be available to the plaintiff tribes are being
9 caught somewhere else or going to spawning escapement?

10 A Yes.

11 Q Do culverts owned by the State of Washington have any
12 role in those constraints?

13 A You mean the constraints on the management units of
14 Fraser River sockeye?

15 Q Yes.

16 A I doubt that they have a large role or any role.

17 Q We'll move a little further inside now and start talking
18 about the Puget Sound fisheries. Are there some salmon
19 stocks from the Puget Sound area where the plaintiff
20 tribes are not taking 50 percent of the harvestable
21 surplus available at their usual and accustomed places?

22 MR. RAAS: What do you mean by "Puget Sound"?

23 MS. WOODS: When I talk about salmon stocks
24 from the Puget Sound area -- and this is not a
25 legal definition. It is not intended to define

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1 but also because in chinook, when we have abundance,
2 say, due to high ocean survival or some other reason, we
3 want, for most rivers, to put those fish on the spawning
4 grounds because we have goals to grow these stocks for
5 recovery to occur.

6 Q So does that mean that the state and the tribes are
7 taking a smaller percentage of the chinook stocks than
8 they were before these exploitation-rate management
9 schemes were involved?

10 MR. RAAS: By "taking" you mean harvesting?

11 MS. WOODS: Yes.

12 A Certainly the overall percentage of chinook stocks
13 harvested has gone down from before. And certainly the
14 state and tribal harvest has been reduced as a
15 percentage than it was before we instituted this, yes.

16 Q (By Ms. Woods) Were we overharvesting the chinook before
17 those measures were instituted?

18 A It depends on what you mean by "overharvesting." There
19 are many factors that caused the decline in chinook. We
20 were able to address the harvest factor most easily, and
21 we expect to see the response to the reduction in
22 harvest most quickly. But the recovery of chinook
23 involves actions not just in harvest management but in
24 hatchery management and habitat management as well. And
25 it's my opinion that significant action in all three of

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1 those areas is required for recovery.

2 Q I've got some more questions about chinook later. So
3 right now I'll ask you about Snohomish chum and why the
4 state and the tribes went to an exploitation-rate
5 management scheme there.

6 A Snohomish and Stilliguamish chum, two management units
7 in our area. Because the fixed escapement goals for
8 most species, particularly chinook and chum, were set
9 several years after the Boldt decision, certainly before
10 my time, based on average escapement, average spawning
11 escapements over some period of time before that, there
12 was a general feeling that the chum were set during a
13 period of time when chum runs were particularly low.
14 And we've seen chum runs increasing, especially in the
15 late 1980's for -- and it was felt that the escapement
16 goals should be increased to meet the maximum
17 sustainable harvest objective. But we had no basis for
18 knowing what it should be increased to. And I am, in
19 particular, a proponent of exploitation-rate management
20 because it takes into account better the natural
21 variability in salmon runs.

22 So we decided to use exploitation-rate management
23 for Stilliguamish and Snohomish as a form of adaptive
24 management, if you will. And also it's easier to
25 implement, more certain to implement, than a fixed

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1 A I don't know that information at this time. It happens.

2 Q To your knowledge has the number of hatchery fish
3 produced within that U.S. versus Washington case area
4 changed during the time you've been at Tulalip?

5 A It's fluctuated. And whether there's been a trend,
6 again, I would have to look. I know some hatchery
7 programs are being curtailed because of the hatchery
8 reform and similar efforts that we have going on now. I
9 also know of other programs that have basically acted to
10 increase hatchery production.

11 Q Did culverts affect hatchery fish?

12 A Culverts could affect hatchery fish in terms of hatchery
13 fish that are released into rivers, for example, have to
14 spend some time as juveniles in fresh water. They need
15 to migrate within the river system just as wild fish do.
16 If their migration is blocked to certain areas, that
17 might increase competition with wild fish. It might
18 cause -- the same things that could happen to wild
19 juvenile fish affected by culverts would happen to
20 hatchery juvenile fish once they're released. If
21 someone blocked access of hatchery fish to a hatchery
22 facility where they were going to to spawn, then that
23 would be a great effect. But . . .

24 Q Do you know of any examples of either of those
25 situations that you described?

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1 A I don't know of specific examples.

2 Q Would you be able to say that culverts in the U.S.
3 versus Washington case area do not impair the tribes'
4 ability to harvest hatchery fish?

5 A Could you repeat that please.

6 Q Do culverts in the U.S. versus Washington case area
7 impair the plaintiff tribes' ability to harvest hatchery
8 fish?

9 A I don't know the answer to that.

10 Q Well, we talked a little bit about the Tulalip tribe's
11 hatchery. What species does the Tulalip hatchery
12 produce?

13 A Chinook, coho, and chum.

14 Q Where does the tribe get the eggs for its hatchery?

15 A The chinook eggs come from the state-operated Wallace
16 River hatchery mainly. The Wallace River hatchery is in
17 the Snohomish River basin. The -- if sufficient eggs
18 aren't available from the Wallace River hatchery,
19 there's a provision to get eggs from other hatcheries.
20 However, that option has been greatly limited with the
21 adoption of our new hatchery management policy.

22 Coho eggs generally come from the Wallace River
23 hatchery, and the chum eggs come from on station, the
24 Tulalip facilities in Tulalip Bay.

25 Q Is the Wallace River hatchery operated by the Washington

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1 Q Do state-owned culverts affect the Tulalip Tribes'
2 fisheries on fish returning to the Tulalip hatchery?

3 A When I answer the question about state-owned culverts, I
4 have to answer in general about culverts.

5 Q That's fine.

6 A I probably should have said that sooner.

7 Probably not directly. Again, there could be
8 instances where they affect the return of fish to the
9 hatchery facility from which the Tulalip eggs come and
10 other indirect effects.

11 Q How does the Tulalip tribe get water for the tribes'
12 hatchery?

13 A The water comes from surface water in Tulalip Creek on
14 reservation and from groundwater, from a well on the
15 Tulalip reservation.

16 Q Is there a dam at the mouth of Tulalip Creek to provide
17 water for the hatchery?

18 A There's not a -- there's -- no, the dam does not provide
19 water for the hatchery.

20 Q Is there a dam at the mouth of Tulalip Creek?

21 A Yes, there is.

22 Q Why is there a dam there?

23 A There was a power generation facility that -- that my
24 understanding is -- I wasn't here then. But my
25 understanding is, sometime in the early 20th century,

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1 A Fix that minimal effect?

2 Q Yeah.

3 A We are incorporating some wild or natural-origin
4 broodstock into the hatchery broodstock at Wallace River
5 hatchery, which also provides fish for Tulalip hatchery,
6 again, based on the recommendations of the Hatchery
7 Scientific Review Group. However, the fraction of
8 natural-origin fish to be incorporated into the hatchery
9 broodstock is smaller than it is for chinook.

10 MS. WOODS: We could break for lunch now, if
11 you want to do that.

12 MR. RAAS: That seems like a good idea.

13 MR. MORISSET: When do you want to start up
14 again?

15 MS. WOODS: At 12:30.

16 [Lunch recess.]

17 MS. WOODS: When you're ready, go ahead.

18 A I have two things to say about, to add to what I was
19 saying this morning.

20 Q (By Ms. Woods) Please.

21 A First is that you asked me about the effects, potential
22 effects, of culverts on fisheries in the ocean off the
23 Washington coast and on the Fraser panel fisheries.

24 Q Yes.

25 A I neglected to mention that there's complex ecosystem

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1 effects, if you will; and culverts could affect the food
2 supply entering the marine waters from fresh water
3 either in terms of fish that -- other anadromous fish
4 that might live in those streams or insects or other
5 foods that fish in the saltwater might eat. And also to
6 the extent that they change the flow patterns coming
7 out, they could affect shoreline geology and other --
8 they could have effects on shoreline, which would affect
9 particularly juvenile salmon that might be passing
10 through those shores even the salmon that originate from
11 someplace else.

12 Q Do you have any specific examples of those situations?

13 A I don't have any specific examples at this time.

14 Q Do you know of any research that's been done on those
15 effects you described?

16 A I know of research that's been done on the fact that
17 juvenile salmon on the shoreline eat
18 terrestrially-derived food that comes from watersheds
19 other than where they were spawned. I know in general
20 of research that's been done on the effects of upland
21 flow on shoreline processes.

22 Q Do you know of any research that connects those things
23 with culverts?

24 A I know of none.

25 I have one other thing. On my C.V. there's a

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1 trout, Dolly Varden, things like that. But for our five
2 species of Pacific salmon plus steelhead, it's true.

3 Q (By Ms. Woods) Is it true for hatchery fish?

4 A Hatchery runs do tend to fluctuate to the same degree as
5 wild runs. I haven't done the anal -- you know, the
6 particular analysis to compare them. But generally
7 speaking, they fluctuate quite a bit as well.

8 Q If that's the case, then is it fair to say that it's
9 some factor that affects both hatchery and wild salmon
10 populations that causes these fluctuations?

11 A The system is very complex. And if the fluctuations are
12 happening in the same direction, you might hypothesize a
13 common factor. But I was just answering in terms of the
14 general pattern of run sizes.

15 Q Why do run sizes fluctuate?

16 A As I said, the systems are very complex. The factors
17 include the production environment. The different
18 factors in the, say for anadromous fish in the
19 freshwater environment, determine how many fish go to
20 sea; and then they include the near-shore marine --
21 estuary near-shore marine environment. And they include
22 what happens in the ocean. And they include when the
23 fish return, including fishing and other factors that
24 affect the survival when the fish return.

25 There are -- those fish are in an ecosystem when

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1 they're out there. So they're affected by all the other
2 components of the ecosystem in complex ways.

3 Q Is there any factor that stands out as being more
4 important than the others?

5 A Well, I don't know what you mean by "more important"
6 because they are all important and they all work
7 together. And the fluctuations that occur because of
8 the complexity sometimes mask trends that are occurring
9 because of changes in factors.

10 So if you have a, say, a long-term decline, for one
11 example, in what's being produced from the freshwater
12 system, that might be masked by the natural fluctuations
13 that are occurring due to the complexity of the system.
14 But it doesn't mean that the long-term decline isn't
15 occurring. So when you say what's the most important,
16 the factors all work together. So it's really hard to
17 answer that.

18 Q Is there any way to apportion fault among those factors?

19 A There might be a way, but you have to understand the,
20 the full complexity of the system.

21 One thing that people sometimes do is what's called
22 limiting factors analysis, and that's supposed to tell
23 you which of all the identified factors that determine,
24 say, the survival rate or the return number, which one
25 if changed would improve the situation.

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1 And that's sometimes a useful way of thinking of
2 it. Especially for me it's useful because it helps you
3 understand that those limiting factors change from year
4 to year, say, or over time.

5 Usually we think about salmon population dynamics
6 in terms of years, year being the smallest unit. So in
7 one year, if you have a certain amount of snowpack and
8 certain temperatures, low flows in the summertime might
9 be your limiting factor that year. But in another year,
10 that factor might be okay because the climate or the
11 weather was different that year; and then another
12 factor, like access to spawning grounds, might be the
13 limiting factor.

14 So that's the kind of complexity I'm talking about.
15 A simple limiting factors analysis is too limited in its
16 applicability, in my view.

17 Q Even given that limited applicability, are culverts ever
18 a limiting factor?

19 A I have not reviewed a lot of limiting factors analyses.
20 I know that they have been identified in many cases as a
21 factor that reduces the production of some salmon below
22 what it would be without that factor.

23 I know they're identified in some general
24 textbooks. I know that they've been identified in some
25 specific analyses, such as the review we did for the

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1 Pacific Council on Chinook and Coho, talked about the
2 Strait of Juan de Fuca coho.

3 Q Are ocean conditions ever a limiting factor?

4 A In the sense that I just discussed, they would be
5 regarded as such in some years in some situations.

6 Q When I say -- are El Nino events, is that, to you, the
7 same thing as ocean conditions?

8 A Well, again, it's a complex system. El Nino, the change
9 in the circulation patterns in the ocean driven by the
10 currents and the equator are sometimes detrimental to
11 our salmon survival up here; and sometimes they can be
12 beneficial because those are acting on an ecosystem
13 where if you depress predators, it might be beneficial
14 to our salmon and if you depress their food -- the
15 nutrients and depress their food, then it might be
16 detrimental to them. So yes, they can be a factor.

17 Q Are you familiar with the term "Pacific decadal
18 oscillation"?

19 A Yes, I am.

20 Q What is it as you understand it?

21 A Pacific decadal oscillation is an identified cycle in
22 ocean conditions that's not exactly -- I'm going to
23 reveal that I don't fully understand this. But
24 that's . . .

25 Q Does anybody?

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1 A Yes. I think -- yes, there are people who understand it
2 quite well, I believe.

3 The point is that the Pacific decadal oscillation
4 refers to cycles of changes in physical ocean conditions
5 that aren't exactly correlated with El Nino events but
6 can have similar effects on survival of salmon from our
7 area. Certain points in the cycle are -- tend to be
8 detrimental to salmon production. Other points in the
9 cycle tend to be good for salmon production, but the
10 correlation isn't perfect.

11 Q How long a cycle is it?

12 A Well, it's a matter of decades. It's about a two-decade
13 cycle from equal point to equal point.

14 Q That's why they call it the decadal oscillation.

15 Does the Pacific decadal oscillation affect salmon
16 survival in fresh water?

17 A Because the ocean conditions drive the climate, not only
18 do they affect salmon survival in the ocean, they can
19 affect the environment for salmon in fresh water. For
20 example, the low-flow condition I talked about could be
21 related to that same cycle. Other factors, too, but I'm
22 not knowledgeable of all those details.

23 Q Do El Nino events affect salmon survival in fresh water?

24 A Similar correlation exists with the ocean conditions, as
25 I just described.

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1 Q Now, with the caveats about the utility of the limiting
2 factor analysis, is marine mammal predation ever a
3 limiting factor for salmon?

4 A You know, a lot of people involved in salmon fishing and
5 salmon management like to talk about marine mammal
6 predation, and there are probably a few cases where it's
7 been pretty clearly identified as a very important
8 factor. But there's not a lot of hard data in the
9 general case.

10 Clearly, we have evidence of marine mammals eating
11 salmon. Clearly, we have the evidence of California sea
12 lions and harbor seals. We see that. To the extent the
13 number of salmon they eat, it's harder to pin down. So
14 the documented cases where you could say it's a limiting
15 factor is there, but there aren't as many of them as you
16 would think from talking to the average salmon person on
17 the street.

18 Q Are any of those documented cases within the U.S. versus
19 Washington case area?

20 A Well, I would say the sea lions at the locks in Seattle
21 affecting steelhead is probably one of those cases.

22 Q Do you know whether rainfall patterns in Western
23 Washington have changed in the past 20 years?

24 A I'd have to look at the data.

25 Q Switch back to some of the fisheries stuff.

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1 Fraser River -- declined in the past 20 years?

2 A Sockeye salmon populations of Baker River sockeye and
3 Lake Washington sockeye and Quinault and Ozette sockeye
4 are highly variable, so I would have to look at the
5 numbers. It would be an average thing. It's more of a
6 variability thing than a trend.

7 Q Has there been a trend in tribal-harvest sockeye that
8 spawn within the U.S. versus Washington case area in the
9 past 20 years?

10 A I would say in general there's been little tribal
11 harvest of sockeye that spawn within the case area in
12 the past 20 years because it's a fishery of opportunity
13 when the harvestable fish are available. So, similar to
14 the run pattern.

15 Q So variable but no overall trends?

16 A That's correct. I would have to look at the Quinault
17 data again to be able to say something about that one.

18 Q Do state-owned culverts or culverts in general -- we'll
19 ask that question.

20 Do culverts have an effect on sockeye production
21 within the U.S. versus Washington case area?

22 A Culverts certainly could have an effect on sockeye
23 production if they block access to spawning areas above
24 lakes or in some cases below lakes.

25 Q Do you know of any examples where that's the case?

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1 A I don't know of specific examples.

2 Q Are there other factors that limit sockeye production
3 within the U.S. versus Washington case area?

4 A Lake physical and biological conditions can affect
5 sockeye production. River habitat, the quality of
6 spawning in rearing habitat or spawning and migration
7 habitat in tributary streams to lakes can affect it; and
8 marine survival could affect it.

9 Q Is there a generally-accepted methodology among fishery
10 biologists for allocating fault among those various
11 factors that you mentioned as possible causes for
12 depressed sockeye production?

13 A If there is, I -- I don't know of it. It's more -- the
14 situation is dynamic, as I described earlier.

15 Q Let's talk a little bit about chum. Have chum salmon
16 populations from the Puget Sound basin -- and defining
17 at my peril Puget Sound as I described earlier -- have
18 chum salmon populations declined in the past 20 years?

19 A The time frames for chums are different for different
20 populations. In general, within the variability that
21 occurs there, I would say there isn't a clear trend in
22 most areas.

23 There is a clear upward trend in south Puget Sound
24 wild chum. And there is -- has been a very strong
25 downward trend in Hood Canal summer chum. And some of

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1 before. So there's been some upward trend in some areas
2 of Hood Canal in summer chum but not in all.

3 Q Are culverts a factor depressing Hood Canal summer chum
4 production?

5 A I'm not aware specifically, but they could be insofar as
6 they preclude access to important spawning areas and the
7 other food factors and affecting the near-shore habitat,
8 those things I mentioned.

9 Q But you don't know of any specific instances.

10 A That's right.

11 Q Now, I heard in another deposition in this case that
12 Skagit chum have a cycle where there's a lot more of
13 them in even years than in odd years. Is that correct,
14 as far as you know?

15 A That's correct.

16 Q Are there other chum stocks that cycle that way?

17 A Generally that's true of north Puget Sound and
18 Stilliguamish, Snohomish, Skagit; and there's a debate
19 about whether it's also true in south Puget Sound and
20 Hood Canal. It's less clear in those areas.

21 Q Does anybody have any idea why they cycle like that?

22 A I know what people say. Many people say that it has --
23 you generally find the stronger cycles in areas with
24 strong odd-year pink salmon runs. So people assume that
25 there's a relationship, sort of negative relationship,

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1 between pink salmon and chum salmon that has -- causes
2 that cycle. But I have no way of knowing if that's true
3 or not.

4 Q So is this the way it works: You have a strong pink run
5 in an odd year and a strong chum run in an even year,
6 and they kind of balance each other? Is that the way it
7 works?

8 A Well, I wouldn't say they balance each other. First of
9 all, they're very different fish. The pinks return
10 earlier. They're much smaller and sometimes much more
11 numerous. So there isn't a perfect balance; and the
12 odd-even cycle isn't a perfect relationship, either.

13 We've certainly had an odd year followed by a
14 smaller even year in our rivers. I'm fairly certain
15 that happened in Skagit as well. But in the loose
16 sense, there's the balance you talk about.

17 Q It's kind of like a time-share condominium deal?

18 A I don't think it's anything like that.

19 MR. STAY: With a maintenance fee?

20 MS. WOODS: Just trying to find an analogy.

21 MR. RAAS: That isn't it.

22 MS. WOODS: Okay.

23 Q (By Ms. Woods) Do state-owned culverts impair the
24 plaintiff tribes' chum fishery in any way?

25 A They could, in the -- again, I don't know the difference

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1 between state-owned culverts and other culverts; but
2 blockages to the fish passage could affect the
3 production of chum salmon in the ways I've already
4 enumerated in answering other questions.

5 Q Do chum tend to be main-stem spawners?

6 A Chum tend to be -- they can be main-stem spawners,
7 certainly. They can spawn in tributaries as well. They
8 are opportunistic in the sense that seeing them move
9 into very small tributaries when they can access them.
10 They tend to do well in areas where they don't have
11 competition. One of my observations is they tend to do
12 well in areas where they don't have competition or
13 possibly predation pressure from other salmon that
14 reside in fresh water year round. In other words, the
15 chum move out of fresh water much sooner than chinook or
16 coho, and so they can thrive in areas where there might
17 not be good freshwater conditions year round that the
18 other species require.

19 Q Have pink salmon populations from the Puget Sound region
20 declined in the past 20 years?

21 A I would say that in terms of a long-term average, it's
22 been relatively a steady state. We observed one of the
23 largest pink salmon runs ever, at least in the north
24 Puget Sound area, in 2003: Probably the largest in 40
25 years. That was followed by a relatively small return,

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1 certainly small compared to what we forecasted.

2 Q In 2005?

3 A In '05, correct. But we also have a even-year pink
4 salmon run in the Snohomish basin which was showing an
5 increase and recently showed a bit of a decline.

6 So . . .

7 Q Has the tribes' harvest of Puget Sound pink salmon
8 declined in the past 20 years?

9 A I believe that the harvest of pink salmon has declined
10 in the past 20 years if you looked at a long-term
11 average.

12 Q Do you know why that is?

13 A I don't know all the reasons. The, the prices for pink
14 salmon have gone down, so they're only profitable to be
15 harvested by gears that can harvest lots of them. So a
16 lot of gears can't harvest lots of fish.

17 Q Were there poor runs of Puget Sound pink salmon in 1999?

18 A I can't recall.

19 Q Do culverts impair the plaintiff tribes' pink salmon
20 fisheries in any way?

21 A They could, to the extent that they block access to
22 spawning habitats, in particular.

23 Q Are pink salmon main-stem spawners?

24 A They're largely main-stem spawners. There is some
25 tributary spawning, but largely they're main-stem

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1 spawnners.

2 Q Is that where you might expect to see a bridge over a
3 larger river?

4 A Right. Yes.

5 MS. WOODS: This could be a good time for a
6 break.

7 MR. STAY: You bet.

8 [A brief recess was taken.]

9 Q (By Ms. Woods) Let's move on to steelhead. Have
10 steelhead populations from the U.S. versus Washington
11 case area declined in the past 20 years?

12 A Compared to the late 1980's and early 1990's, the
13 steelhead -- wild steelhead populations today are much
14 lower than they were then.

15 Q Have state and tribal fisheries reduced their harvest
16 rates on wild steelhead in the past 20 years?

17 A Yes, they have.

18 Q Why?

19 A In response to the decline in abundance, the allowable
20 harvest of wild steelhead's been reduced, so harvest
21 rates have had to have been reduced.

22 Q Were the state and the tribes overharvesting steelhead
23 20 years ago?

24 A 20 years ago, no. No, we were in general, you know,
25 about half the time, making wild -- reaching wild --

1 they hit the coast on their return to the river. You
2 need to account for all that harvest and indirect
3 mortality associated with that harvest in order to build
4 each run back from the escapement.

5 They have -- we have the -- we use coded wire tags
6 to do that analysis, and there's a fairly complex model
7 called the mixed stock model that is needed to account
8 for all the fish in all of the mixed stock fisheries.
9 And that's not -- that time series of that analysis is
10 not available for the entire 20- or 25-year period we're
11 talking about. So for that reason, it's hard for me to
12 answer that question about total run size of coho. I've
13 been looking for information.

14 Q Have tribal harvests of coho salmon from the U.S. versus
15 Washington case area declined in the past 20 years?

16 A In general, if you compare the period of the late '80s
17 and early 90's to today, yes, they have declined.

18 Q Why is that?

19 A A number of factors that I think we've already
20 mentioned: More attention to management for specific
21 stocks in more fisheries; therefore meaning that lower
22 run sizes will affect fisheries downward. Maybe more --
23 lower run sizes in particular stocks will affect
24 fisheries in a downward sense more than they have in the
25 past.

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1 In some years we've noted a lower effort, possibly
2 because it wasn't cost effective to venture farther to
3 catch fish. Although coho is one case where certainly
4 the price has increased in recent years. And in our
5 area we've seen more participation in the fishery that
6 harvests wild fish.

7 Q Let's take a look back at Exhibit 4.

8 A [Witness complies.]

9 Q And the table that we were looking at just before lunch,
10 Coho Table 2-A.

11 MR. MORISSET: Counsel, may I ask a question
12 about this table because I'm just confused? I have
13 a 2-A --

14 MS. WOODS: There's a chinook 2-A.

15 MR. MORISSET: -- a 2-B chinook, a 2-B
16 chinook, a 2-C chinook, and then another 2-A on
17 chinook again. It looks like exactly the same
18 thing, but a different of one minute on the time.
19 Is it just a doubling up here, or -- I'm confused.
20 I'm sorry to interrupt. But . . .

21 MS. FOSTER: Some is coho and some chinook.

22 MR. MORISSET: I know. I know. It says
23 chinook. Chinook, chinook, chinook and then
24 chinook again. 2-A, chinook, chinook again.

25 MS. WOODS: The chinook, the second set of

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1 view, there are always benefits from additional
2 escapement.

3 Q Are coho unable to spawn effectively because of culverts
4 getting in the way?

5 A Certainly, coho spawn in tributaries that are blocked
6 by -- their migration into those tributaries can be
7 blocked by culverts. And to the extent that that limits
8 their available spawning area, that is going to limit
9 the production that can occur from a given number of
10 fish escaping to a river.

11 Q But that's kind of a theoretical, abstract thing. Do
12 you have any specific examples?

13 A I have no specific examples.

14 Q You mentioned in setting these fisheries for 2006 it
15 depends in part on the expected effort levels. What do
16 you mean by "effort"?

17 A The amount of people or gear fishing in the different
18 areas or the number -- yeah, amount of gear fishing for
19 how many days.

20 Q Could there be additional effort -- kind of like a
21 question I asked before, but could there be additional
22 effort?

23 A Could additional effort be accommodated?

24 Q Yeah.

25 A In many of these fishery categories, there's an estimate

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1 A I've not done that analysis; but it's my guess that some
2 of the difference, anyway, can be explained by different
3 habitat, water temperature and flow conditions and
4 things like that.

5 Q Do culverts limit production of coho in the Snohomish
6 basin?

7 A Again, as I explained, the limiting factors is something
8 that's dynamic and isn't the same from year to year.
9 Certainly -- and I don't know of specific culverts in
10 this Snohomish system. But certainly, if there are
11 culverts that block access to spawning habitat or
12 rearing habitat, it's likely they would limit
13 production, yes.

14 Q Are culverts a limiting factor for any river system in
15 the Puget Sound basin?

16 A Again, I explained that the limiting factors is a
17 dynamic concept; and there's not one limiting factor
18 under one set of conditions. So the answer is the same
19 as I just gave for Snohomish coho.

20 Q Is there a generally accepted methodology for allocating
21 fault among the various factors that could limit
22 production of coho?

23 A If there is, I'm not aware of it.

24 Q Are you familiar with the term "ecological functions"?

25 A Well, I'm not -- if it's a technical term that habitat

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1 essential for the recovery of Stilliguamish chinook?

2 A There's a debate about that. There has been some
3 analysis, and the current thinking is that it is
4 essential for the recovery of North Fork Stilliguamish
5 chinook.

6 Q Is that your opinion?

7 A In my opinion, the jury is still out on that question.
8 But it's very clear that the analysis that the current
9 decision is based on, you know, we reached those
10 decisions jointly and we operate that way.

11 Q If the state removed or replaced all its culverts in the
12 Stilliguamish basin, would the supplementation program
13 still be considered essential for recovery?

14 A I can't answer that question in particular, but one
15 would have to look at the specific culverts and predict
16 how they would be used by returning fish and predict how
17 that newly opened habitat would be used.

18 Q Are culverts a factor depressing Stilliguamish chinook
19 production?

20 A To the extent that culverts block access to essential
21 habitat for spawning and rearing, they are a factor.

22 Q But you don't have any specific examples?

23 A I don't have any specific examples.

24 Q Staying with Exhibit 7, moving on to the next section,
25 "Snohomish River Management Unit Status Profile," I

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1 just from this data set. But it's one thing that's
2 consistent with it.

3 Q Is the productivity of Snohomish chinook better than the
4 productivity of Stilliguamish chinook?

5 A The, again, it's hard to turn that word "better" into a
6 objective technical assessment; but I'll do my best.
7 The Snohomish chinook clearly showed an early response
8 to reduced harvest rates. Stilliguamish chinook did
9 not. That suggests to me that -- so I'll loop back
10 around and say, yes, I would say from that, that that is
11 better.

12 Q Why is there that difference between those two river
13 systems?

14 A I don't know all the complexity that causes the
15 difference, because there are so many habitats that the
16 fish use during so many different parts of their life
17 cycle. The factors that are cited that we previously
18 discussed in the Stilliguamish documents are clearly
19 factors for reduced productivity that aren't as
20 prevalent in the Snohomish system as they are in the
21 Stilliguamish system. But that's just one part of the
22 picture.

23 Q Can the difference be explained by culverts?

24 A I have no specific knowledge about that.

25 Q Are naturally spawning chinook from the Snohomish

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1 watershed affected by culverts?

2 A They certainly could be, to the extent that those
3 culverts block essential spawning and rearing -- access
4 to the essential spawning and rearing habitat for the
5 chinook.

6 Q But you're not aware of specific instances?

7 A That's right.

8 Q I know we've touched on this quite a bit already. But
9 generally what factors limit productivity of naturally
10 spawning chinook from U.S. versus Washington case area?

11 A To answer that, even though it's going to be a brief
12 answer, I have to distinguish between productivity and
13 capacity for production, just to make it clear. So to
14 directly answer the question, survival at every
15 transition from every life stage affects productivity.
16 So we talked about egg-to-fry survival. Fry to the
17 estuary, estuarine resident survival, survival from when
18 the fish are in the estuary, then they -- or in the
19 lower river, they smolt and are able to go to salt
20 water. So survival from the stage where they leave the
21 river and they're in the marine shore environment and so
22 forth. So anything that affects those survival rates
23 directly affects productivity, the amount of future fish
24 that can be produced from current spawners.

25 But also at the same time there are

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1 suitable for different purposes, I guess is what I'm
2 trying to say.

3 Q Are there situations where fish habitat in the U.S.
4 versus Washington case area has improved in the past 20
5 years?

6 A In the past 20 years? I would say there probably are.
7 I'm not sure I can cite specific examples, though.

8 Q Have there been improvements in logging practices during
9 that time?

10 A I'm not knowledgeable about that area.

11 Q Has the state made progress in identifying and fixing
12 fish-blocking culverts during that time?

13 A I'm -- I don't know the answer to that.

14 Q Do state-owned culverts impair the Tulalip tribe's
15 fisheries in any way, any specific way that you know
16 about?

17 A No, because I don't know of any -- I don't know
18 specifically one culvert from another.

19 Q Do the tribes engage in any activities that you believe
20 would adversely affect fish populations?

21 A To the extent that the tribes engage in activities that
22 affect fish habitat, I don't know what "tribes engaging
23 in an activity" means as opposed to someone else
24 engaging in an activity. But the cumulative effects of
25 human actions have certainly affected fish populations.

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C E R T I F I C A T E

STATE OF WASHINGTON)

) SS

COUNTY OF KING)

I, Jacqueline L. Bellows, a Notary Public in and for the State of Washington, do hereby certify:

That the foregoing deposition was taken before me at the time and place therein set forth;

That the witness was by me first duly sworn to testify to the truth, the whole truth, and nothing but the truth; and that the testimony of the witness and all objections made at the time of the examination were recorded stenographically by me, and thereafter transcribed under my direction;

That the foregoing transcript is a true record of the testimony given by the witness and of all objections made at the time of the examination, to the best of my ability.

I further certify that I am in no way related to any party to this matter nor to any of counsel, nor do I have any interest in the matter.

Witness my hand and seal this 5th day of June, 2006.

Jacqueline L. Bellows, Notary
Public in and for the State
of Washington, residing at
Arlington. Commission
expires October 19, 2006.